



Department of Physics  
Sharif University of Technology

## Lecture course on Classical and Quantum Dynamical Entropies



**By Prof. Fabio Benatti**

Department of Physics, University of Trieste, Italy

Kolmogorov dynamical entropy provides a link between the entropy production in classical ergodic systems and the algorithmic complexity of phase trajectories. Using the algebraic approach to quantum statistical mechanics, the course offers a short introduction to these concepts and to their extensions to quantum dynamical systems.

Lecture 1	8 March 2014, 17 Esfand 1392	Time: 16:30-18:30
Lecture 2	9 March 2014, 18 Esfand 1392	Time: 16:30-18:30
Lecture 3	10 March 2014, 19 Esfand 1392	Time: 16:30-18:30
Lecture 4	11 March 2014, 20 Esfand 1392	Time: 16:30-18:30
Lecture 5	12 March 2014, 21 Esfand 1392	Time: 16:30-18:30

Location: Room 412.  
Department of Physics.  
Sharif University of  
Technology

- **Title 1:** Kolmogorov-Sinai Entropy and classical Dynamical Systems: partitions of phase space, entropy production and dynamical stability
- **Title 2:** Kolmogorov-Sinai entropy and Algorithmic Complexity: a theorem of Brudno.
- **Title 3:** Quantum Dynamical Entropies: Connes-Narnhofer-Thirring state decompositions versus Alicki-Fannes quantum spin-chain models
- **Title 4:** Quantum Algorithmic Complexities: universal probability and Gacs universal density matrix